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(Eds.)

The **Powerful** Garden

Emerging views on
the garden complex

Garant



Policy Research Centre on Space & Housing

This publication has been realised with the support of the
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Garant
Antwerpen-Apeldoorn



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Chapter 4.

For every house a garden...

A morphological assessment of residential development in Flanders' rural areas

Thomas Verbeek, Ann Pisman, Hans Leinfelder & Georges Allaert

Introduction

Since gardens are intrinsically linked with houses, we assume that garden development goes hand in hand with residential development. The first chapter already described the historic linkage of home and garden. A domestic garden can be seen as a private micro-open space belonging to a house and a household. Dewaelheyns et al. (2009) describe a garden as 'an either open or enclosed private piece of land situated on a house lot and/or associated with a house and used for a non-professional purpose'.

In a survey of OVAM in 2007 (MAS Research, 2007), 84% of the respondents claim to have a garden. According to the results of the National Socio-Economic Enquiry of 2001 (carried out by the Directorate-General Statistics Belgium), almost 77% of Flemish households have a garden. Many people also aspire to become the owner of a house with a private garden.

According to an enquiry by Verhetsel et al. (2003), more than 70% of the Flemish adolescents state that it is important to have a garden with their imaginary first house. Another enquiry conducted in the city of Ghent (O2 Consult et al., 2009) confirms these figures: a private micro-open space is considered very important by most target groups.

Although in general gardens are 'followers' of habitation and urbanization (Dewaelheyns et al., 2009), some spatial variation exists in Flanders. Respondents living in rural areas are more frequently garden owners than those living in urban areas. This is confirmed by the OVAM study (M.A.S. et al., 2007) and the National Socio-Economic Enquiry of 2001. Also Tratalos et al. (2007) state that more gardens can be found in (rural) areas with predominantly detached or semi-detached housing. Spatial variations

can be noted when looking at the size of the garden. Dewaelheyns et al. (2009) found that individual gardens are larger when situated further from urban areas. This finding is also confirmed by the National Socio-Economic Enquiry of 2001.

In Flanders, many people live in rural areas, outside residential cores. This pattern of sprawled residency has a historical background (De Decker in Chapter 1; Leinfelder & Allaert, 2010) and still continues to develop. Pisman et al. (2008) show that the number of households living in non-urban areas is still rising, despite the intentions of the Flemish spatial policy (Ministerie van de Vlaamse Gemeenschap, 1997) to maximally safeguard the open space. Because houses and gardens are linked, it can be concluded that gardens occupy a large part of Flemish rural and semi-urban areas and are consequently part of the concern about the urbanization of the countryside.

In recent years, especially in Flemish rural areas, the tendency toward increasing individualization and the private use of land can be found. Not only is the rural house parcel privatized by setting up a private garden – and often materialized by a fence – but also adjacent parcels, and even isolated parcels, are increasingly used in a private way. Well-known examples are extensions of the garden on adjoining parcels, the establishment of vegetable gardens in former farming plots and above all the transformation of agricultural land to private horse pastures (Bomans & Gulinck, 2009). This transition to private

use seems to occur predominantly in the vicinity of residential development (Verbeek et al., 2010b). So, an analysis of the pattern of built-up elements not only gives information on the garden pattern but also on other phenomena of private land use.

Empirical research (Verbeek et al., 2010b) suggests that the phenomena of higher private land use occur in a higher degree at the backside of ribbon developments. These backside lots are often difficult to access, and altogether, they contribute to land use fragmentation. As a consequence such land ceases to be suitable for productive agriculture. So it can be stated that the parcels adjacent to existing backyards are very likely to become privatized.

In this chapter a morphological analysis of the Flemish rural areas is made, followed by an evaluation of the usefulness of this technique for the study on gardens and other garden related land uses. The structure is as follows: we start with a brief overview of literature concerning individualization, privatization and their consequences on the use of rural and semi-urban land. Then we describe a new method to analyze morphological patterns in Flemish rural and semi-urban areas. The resulting insight in residential morphology will also give information on the distribution of gardens. Afterwards a method to discern enclosed parts of open space will be explored. A few examples will prove the usefulness of the developed methods for the research on garden patterns and the private use of rural land.

Gardens as examples of privatization and individualization

The apparent increase of private land use can be understood within the broader societal evolution of individualization, which implies the control over your own money, your own time, your own body, your own happiness (Schnabel, 2004) and also your own private piece of land (Beck, 1992). This individualization trend started in the 18th century, developed in parallel with the rise of capitalism, and became dominant halfway through the 20th century (Giddens, 1991; Sennett, 1977). The increasing independence of the individual is only possible in societies with a high degree of specialization and functional differentiation, and with a corresponding high production of goods and a high level of amenities. These are all elements of contemporary western societies.

In the last decades an evolution towards hyper-individualism can be observed, related to a strong individualization of consumption, while individualization was initially linked with production. This evolution can be spatially translated to the ideas of 'privatization' and 'capsularization' (De Cauter, 2005). 'Privatization' points to the moving of human activity from the 'public' space to the 'private' space, which threatens the survival of the public sphere (Lofland, 1998). 'Capsularization' stands for the idea that people want to live in capsules: inwardly directed, isolated spaces that stand for security, privacy and hygiene; but that radically ignore the environ-

ment in which they are situated (De Cauter, 2005). This privatization and capsularization can be clearly noticed in the Flemish countryside. Many people prefer to buy or build a detached house in a peripheral location, surround it with a private – often fenced off – outdoor area and if possible also a private recreational pasture. Living in the countryside has evolved from a necessity to a choice.

Some relevant research has already been carried out in recent years about gardens and the privatization of Flemish rural areas. Pisman et al. (2008) showed that the number of people living in rural areas has declined in the period 1998-2007. This corresponds to one of the objectives in the Flemish spatial policy (Vlaamse Overheid, 1997), namely to reinforce the existing residential cores. Yet the number of households in rural areas has increased as the households become smaller. An increase of households in rural areas leads consequently to an increase of houses and so of gardens (apartments are rare in these areas). This tendency conflicts with the objectives in the Flemish spatial policy.

These results correspond with the study of Dewaelheyns et al. (2009). They assessed to what extent the garden area in Flanders increased between the period 1988-1990 and 2002-2005. Based on their sample, 8.4% of the Flemish garden area that existed in the period 2002-2005 is new when compared to the garden area in the period 1988-1990 and most of these gardens occupy former agricultural land. This proves that the increase in garden area really is an actual process.

Concerning the increasing presence of recreational pastures in Flemish rural areas, an analysis on the spatial importance of the horse sector has recently been carried out by Bomans & Gulinck (2009). They estimate the total number of horses in Flanders at 150,000. Based on a random field survey they conclude that 30% of all pastures, or approximately 5% of the Flemish territory, is horse pasture. Furthermore they conclude that small parcels close to gardens and/or woods have a significantly higher chance of being used for horse keeping. They conclude that on a municipal level a strong fragmentation of the rural area, an urbanized character, a high density of gardens and pastures and small parcels lead to a significantly higher concentration of horses.

The results of a recent terrain study (Verbeek et al., 2010b) confirm that the private use of rural land is an actual phenomenon in Flanders. In 18 micro study areas, in six different municipalities, indicators of the private use of space were found. The researchers attempted to define some determining conditions. They showed that the proximity of the built environment and the parcel size are correlated with the presence of private land use. Private land use is more frequent adjacent to residential development and small parcels are more susceptible than large parcels.

Because of the abundance of scattered and linear development (Verbeek et al., 2010a; Xaveer De Geyter Architecten, 2002), a large part of Flemish rural areas is close to residential development and consequently suscep-

tible to this transformation to private land use. Ribbons of (residential) development, in combination with scattered residential settlements, cause the enclosure and fragmentation of space. Professional agriculture loses interest in such fragments. Consequently other functions, like recreational farming or other recreational activities start to develop, sometimes as part of multifunctional agriculture. These small open spaces, surrounded by residential development, often lack the economic, ecological or cultural values that can ensure preservation (Leinfelder, 2007). Leinfelder suggests that these enclosed spaces might be considered new public spaces in the Flemish network city. This might be possible by stimulating types of multiple land use and inserting peripheral attractors. Also Mels (2006) concentrates on these open space 'rooms'. These enclosed spaces are only partly visible and are literally as well as figuratively detached from other open space areas. In her research by design, she explores a new future for these spaces and concludes that they have a capacity to absorb different forms and functions. However, in reality it seems that these enclosed spaces, screened off from the passerby, are undergoing a gradual transformation from agriculture to extensions of existing gardens.

Research method

Study area

The research on the building pattern focuses neither on the urban areas nor on the village

centers, but on the urbanization processes in the rural and semi-urban areas. For this purpose, the study area is defined as the entire region of Flanders, excluding all cities and village centers as defined by the Directorate-General Statistics Belgium (ADSEI). What is left is a dispersed, rural to semi-urban area used for diverse functions and activities such as agriculture, nature, recreation and housing (Figure 4.1).

The study area stretches out over 79% of the Flemish territory and can be described as rural to semi-urban. Domestic garden access in the study area (92%) is higher than corresponding figures for the concentrated resi-

dential areas (74%) or the Flemish average (77%), as shown in Figure 4.2. Furthermore, 83% of the gardens in the study area is larger than 50 m², compared to 71% of the gardens in residential areas and the average of 73% for Flanders.

Quantifying and assessing building patterns

Only recently quantitative methods have emerged to attain a more systematic classification and analysis of settlement patterns and of urban sprawl in particular. In the last few years, indices for defining and measuring building patterns have been widely discussed in litera-

Figure 4.1 Study area.

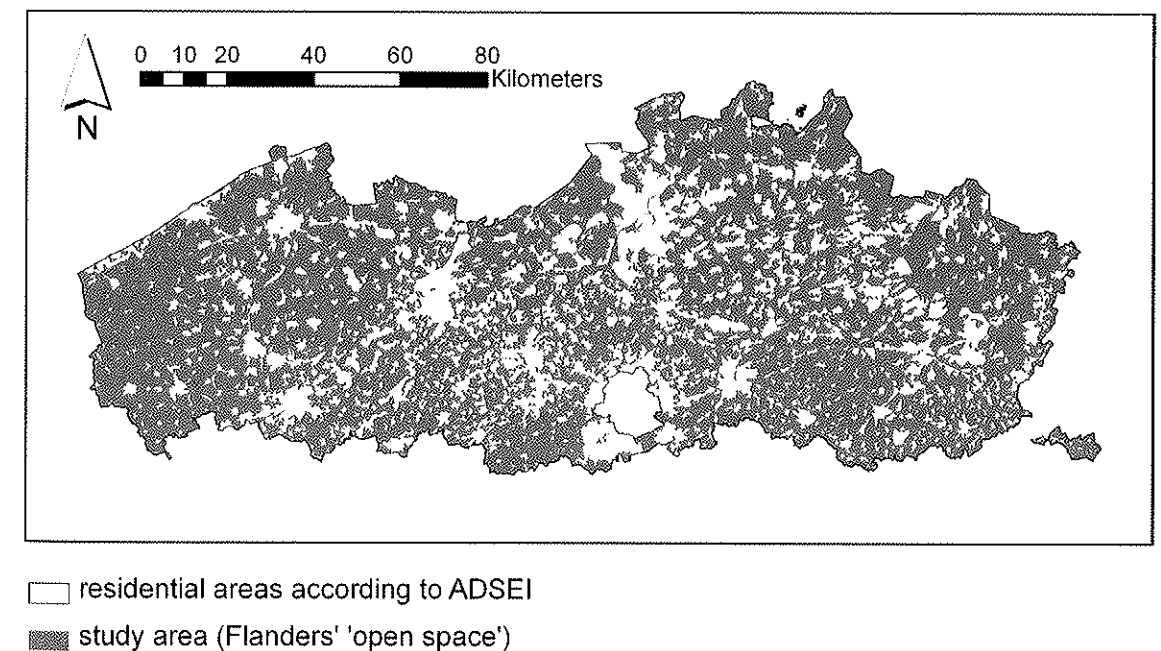
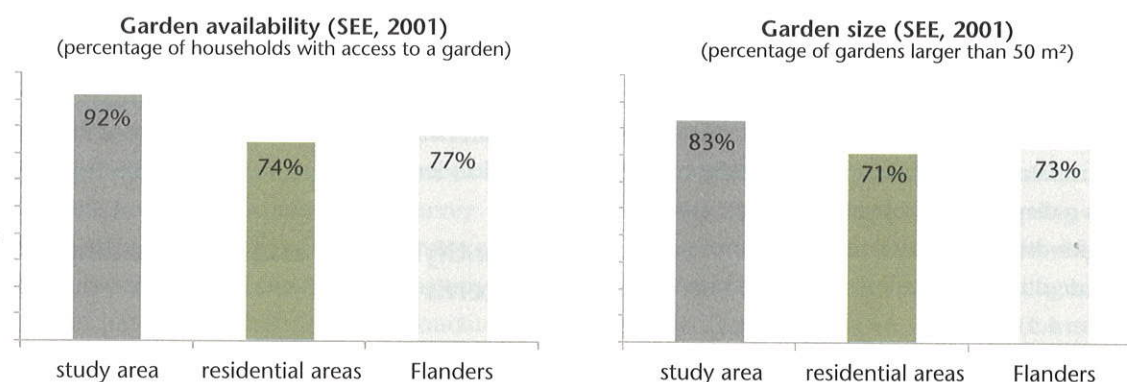


Figure 4.2 Garden availability and garden size in the study area.



ture. Many of these approaches use a relatively coarse spatial resolution in their underlying unit of analysis. Often satellite images are used to quantify settlement patterns (Huang et al., 2007; Poelmans & Van Rompaey, 2009). Huang et al. (2007) calculated seven spatial metrics that capture five distinct dimensions of urban form (complexity, centrality, compactness, porosity and density) in order to compare different cities and countries throughout the world. Such methods are useful for comparing one metropolitan or urbanized area with another throughout the world. However, these methods are limited in their ability to distinguish spatial details of urban growth and to analyze regions with a lower building density.

When data of higher resolution are available, more sophisticated indicators of urban sprawl are applicable at different scales. The possibilities include a statistical-area-level approach (Ewing et al., 2002), a housing-unit-level approach (Hasse & Lathrop, 2003), a development-tract-level approach (Hasse, 2004) and

a census-block-level approach (Galster et al., 2001; Tsai, 2005). Ewing et al. (2002) created a sprawl index for US cities at the statistical-area-level based on four factors: residential density, neighborhood mix, activity strength and accessibility. Hasse & Lathrop (2003) developed five spatial metrics at the housing-unit level for analyzing spatial patterns of urban growth: urban density, leapfrog, segregated land use, highway strip and community node inaccessibility; and then combined them to form a meta-sprawl index. Galster et al. (2001) captured eight dimensions of sprawl: density, continuity, concentration, clustering, centrality, nuclearity, mixed uses, and proximity; and made use of a grid to operationalize these dimensions. In these different approaches the indicators are intended to analyze urban structures of rather high density. Furthermore, many of the standard metrics are strongly correlated and very few take the location of the buildings into account.

A new direction in sprawl research addresses sprawl at the level of buildings, this does not

directly result in sprawl indicators but analyzes the settlement pattern itself. Thomas et al. (2008) identified individual buildings using digitized topographical maps (1:10,000) and land registries ('Cadastre'). The result of this exercise is a distinction between built-up and non built-up sites, which is subsequently used to explore the potential of fractals for measuring the spatial organization of built surfaces in built-up landscapes in Wallonia (Thomas et al., 2008). Fractal indices seem to be helpful for measuring to what extent the built-up area is distributed in a uniform or a more varied way within an urban pattern.

It is clear that methods used to analyze building patterns differ. Since this research on Flemish building patterns focuses on the rural and semi-urban area, it is unfavorable to analyze these patterns through the development of aggregated indicators due to the low density of buildings and the very specific spatial structure. There is a need for more specialized and context-specific metrics at the micro level dealing with the morphological aspects of the settlement pattern. Therefore, a new method is being developed.

Datasets used include shapefiles with the cadastral parcels and buildings, the road network and the boundaries of the residential areas.

GIS analysis of residential development

Residential development, although generally perceived as chaotic, has in reality some

consistency in patterning. It is composed of 'ribbons' of buildings – ribbon development – and 'dots' of buildings – scattered development. Through GIS-techniques, it is possible to extract and generalize these patterns, so as to provide new insights in the spatial structure. Furthermore, making use of the resulting file with residential ribbons and a data set with the boundaries of residential areas, a method has been developed to define enclosed fragments of unbuilt land.

Ribbon development is composed of roads, or parts of roads, and adjacent continuous strips of built lots. By defining buffers of 25 m starting from the built elements, such parts of roads can be selected and ribbons can be indicated. Two techniques are applied, making use of the two road network files. The first technique calculates the length of selected parts of the roads. When the selected part is more than 200 meters long, it is selected and defined as a ribbon. The second technique starts from the selected parts of roads. The 'built' length of a road part is compared to the total length of that segment. If the ratio is over 80%, the road segment is selected as ribbon development. The combination of these two techniques leads to a representation of ribbon development in Flanders' rural areas. The selection of ribbon developments is illustrated in Figure 4.3. The limiting values of 200 m and 80% are based on assumptions. More research is needed to decide on the best threshold values.

The constructions that are left over after defining the ribbons are scattered built ele-

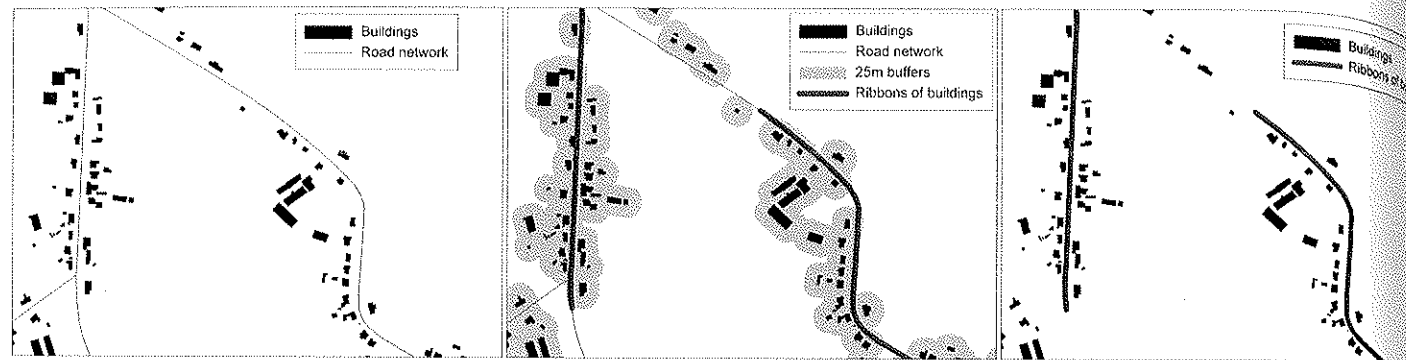


Figure 4.3 Selection of ribbons of buildings.

ments or dots of buildings. To distinguish the dots, 200 m buffers are drawn around the selected ribbons and the residential areas of villages and city centers. Buildings situated within these buffers are considered to belong to these ribbons or to the residential settlements. The remaining buildings, even if isolated, may form a discrete group. To cluster these buildings into discrete groups, buffers of 25 m are set from the remaining buildings. Overlapping buffers are merged in

clusters or dots. Figure 4.4 shows the selection of dots of buildings. The same calculation was made with a 100 m buffer around ribbons and residential areas, but this gave similar results.

Making use of the three techniques described above, the building pattern can be simplified to an abstract pattern of ribbons and dots. This generalization process is illustrated in Figure 4.5.

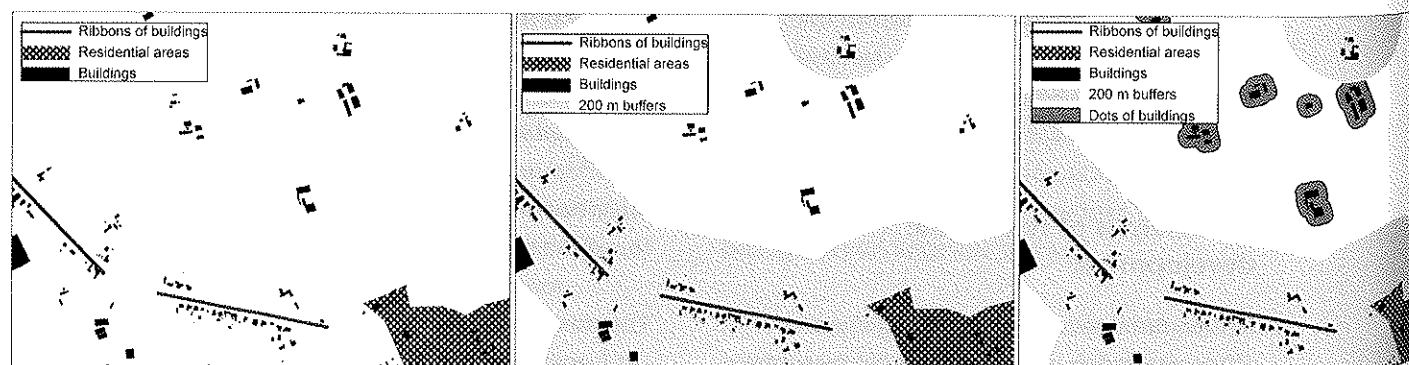


Figure 4.4 Selection of dots of buildings.



Figure 4.5 Generalization of the building pattern.

The enclosed fragments of unsealed land, lying outside demarcated residential areas, are defined starting from a network file composed of roads and the boundaries of residential sectors. By deleting all dead end streets, a 'closed' network file is created. This file is converted to polygons and the polygons corresponding to the residential areas are deleted. For each fragment, the area is calculated and the percentage of the perimeter is calculated that is occupied by residential ribbons or by the boundaries of residential areas. By choosing the respectively limiting minimal values of 100,000 m² area and 70% built perimeter, the enclosed fragments of unsealed land can be selected. The limiting values were the result of a trial-and-error sequence. The limiting value of 70% is not very high, because completely surrounded fragments of unsealed land are rare and because it is assumed that a partially

surrounded open space fragment also runs a higher risk of privatization. The selection process is shown in Figure 4.6, while Figure 4.7 gives an example of an enclosed fragment of unsealed land.

Results

Building density

In Figure 4.8, two areas outside the residential statistical sectors show a high building density: the urban network area Kortrijk-Roeselare (1) and the area Bonheiden-Keerbergen (2). In the periphery of Flanders, building densities are lower, for example in the westernmost part of Flanders (3) or the Haspengouw area (4). Another interesting fact is the rather intermediate or low density of buildings in

Figure 4.6 Selection of enclosed fragments of unsealed land.

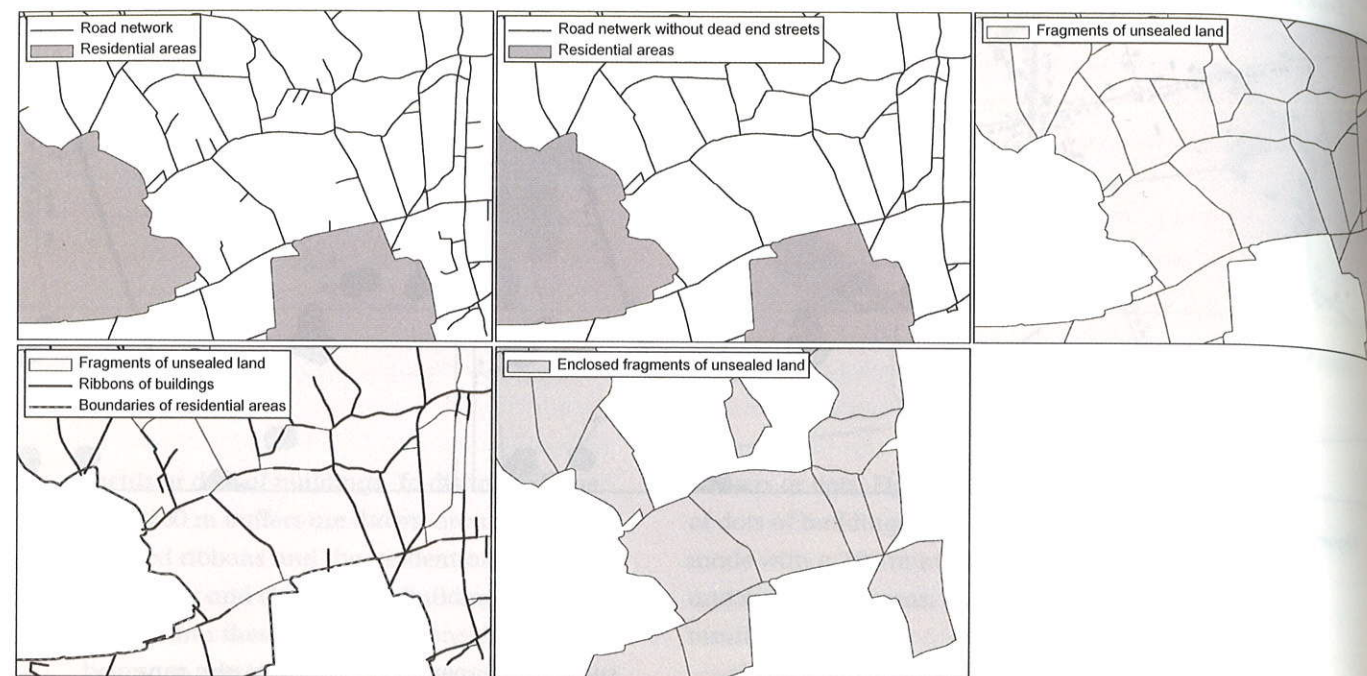


Figure 4.7 Example of an enclosed fragment of unsealed land (the transecting straight line in the north is not a road but part of a high-tension line).



the non-residential statistical sectors within the so-called 'Flemish Diamond' (5). This is the most central part of Flanders between the cities of Ghent, Antwerp, Brussels and Leuven. This area is considered the economic heart of Flanders and is assumed to be an urban conglomerate in policy documents (Vlaamse Overheid, 1997). Figure 4.8 however, shows that the study area in this region is not more densely built than in other Flemish regions. In other words, these results suggest that there is not really a metropolitan conglomerate,

in contrast to the prevailing assumptions of geographers and spatial planners.

Density of ribbons

Figure 4.9 shows the density pattern of ribbons in Flanders' rural and semi-urban areas. It is clear that most of the ribbons are situated in the central part of Flanders, in an area that extends from Bruges and Roeselare (1) in the West to the urban region of Hasselt-Genk (2) in the East, with the urban regions of Ghent

Figure 4.8 Building densities in Flemish rural and semi-urban areas, per statistical sector (2005).

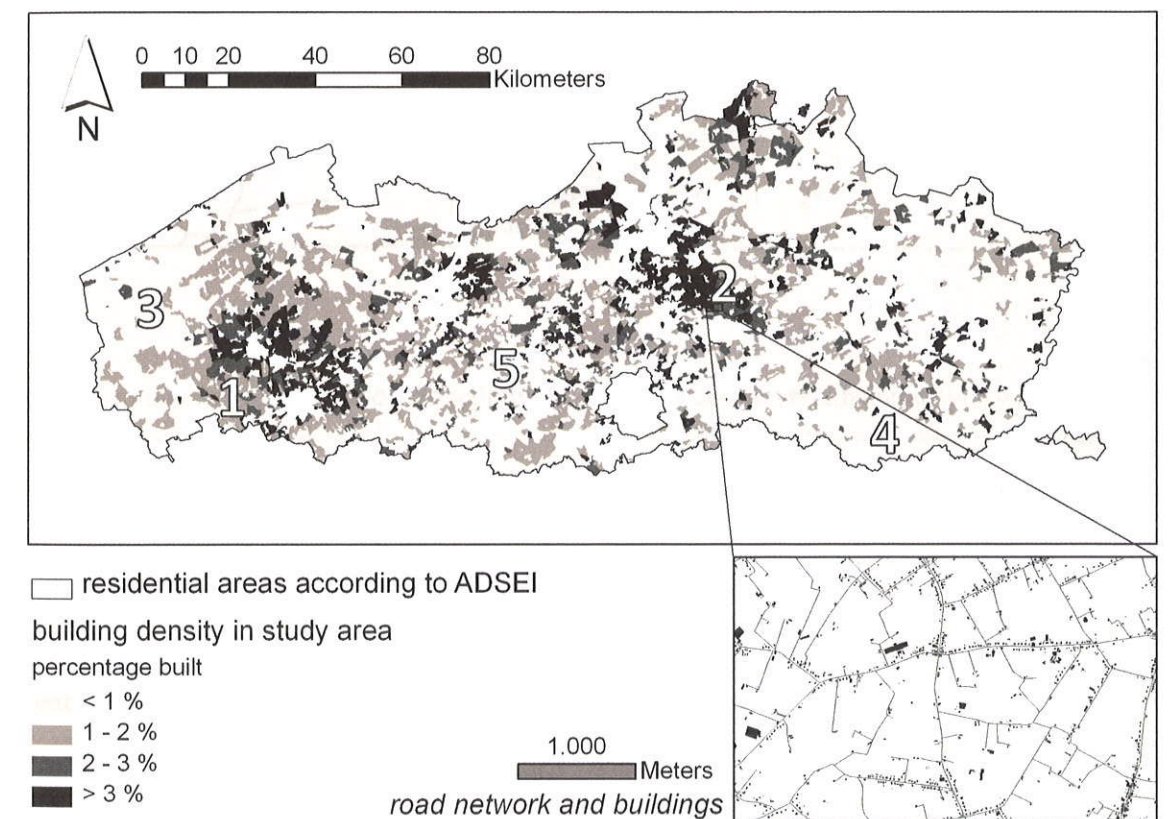
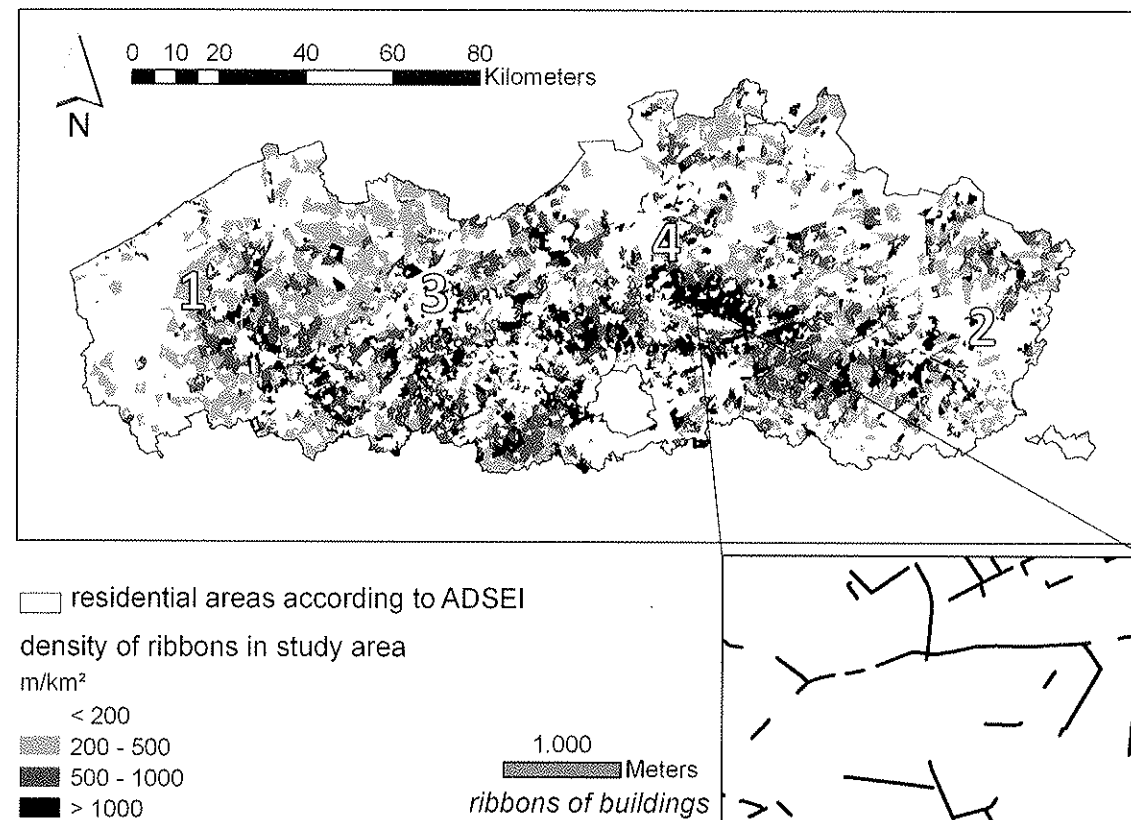


Figure 4.9 Ribbon densities in Flemish rural and semi-urban areas, per statistical sector (2005).



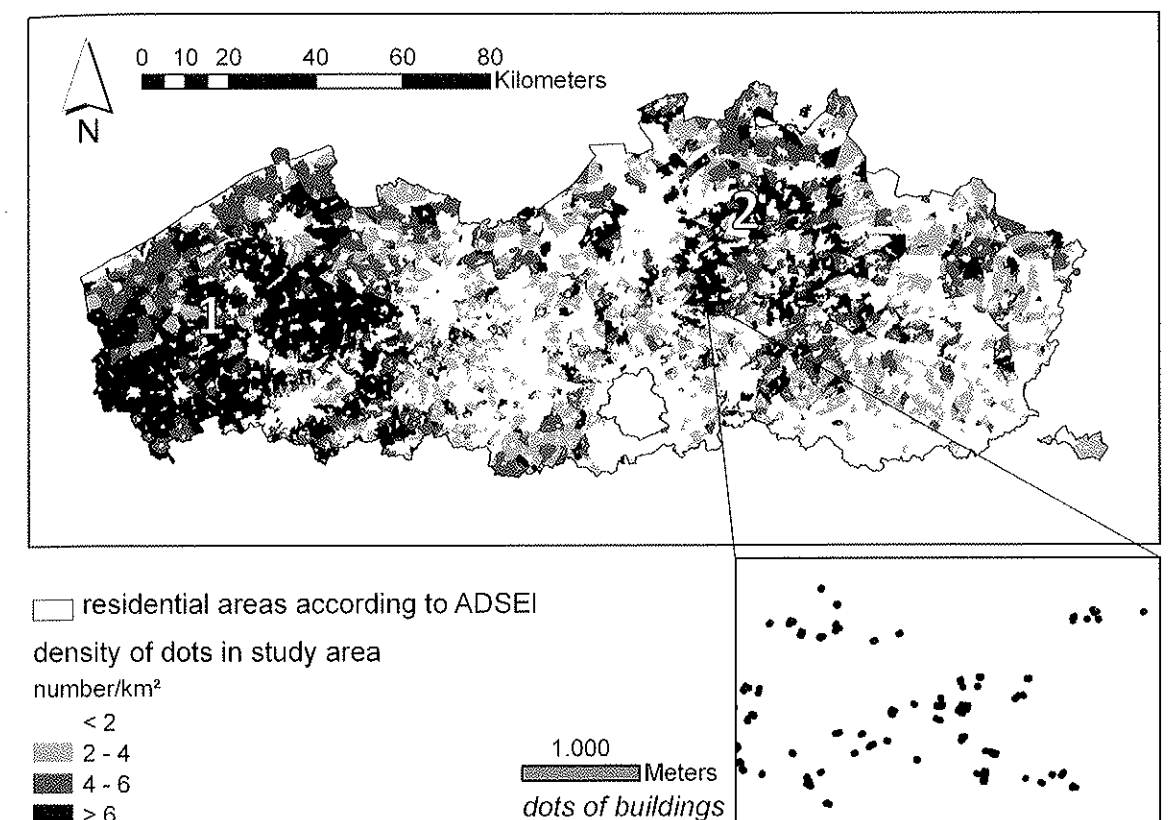
(3) and Antwerp (4) situated in the northern frontier.

In the more central part of Flanders the outer areas of the villages and city centers are dispersed. The connecting streets between villages are often built up with houses, shops or small industrial plants. This results in a landscape dominated by buildings, in which the open spaces are often hidden behind a building strip (Xaveer De Geyter Architecten, 2002).

Density of dots

The map with buildings shown as densities of dots exhibits a different pattern, see Figure 4.10. The building dots or scattered buildings are mostly situated in the peripheral parts of Flanders, especially in the province of West-Flanders (1) and the Campine area (2). In these areas the scattered buildings are often older houses, or agricultural buildings situated in an open landscape. The eastern, western and northern part of Flanders differ

Figure 4.10 Dot densities in Flemish rural and semi-urban areas, per statistical sector (2005).



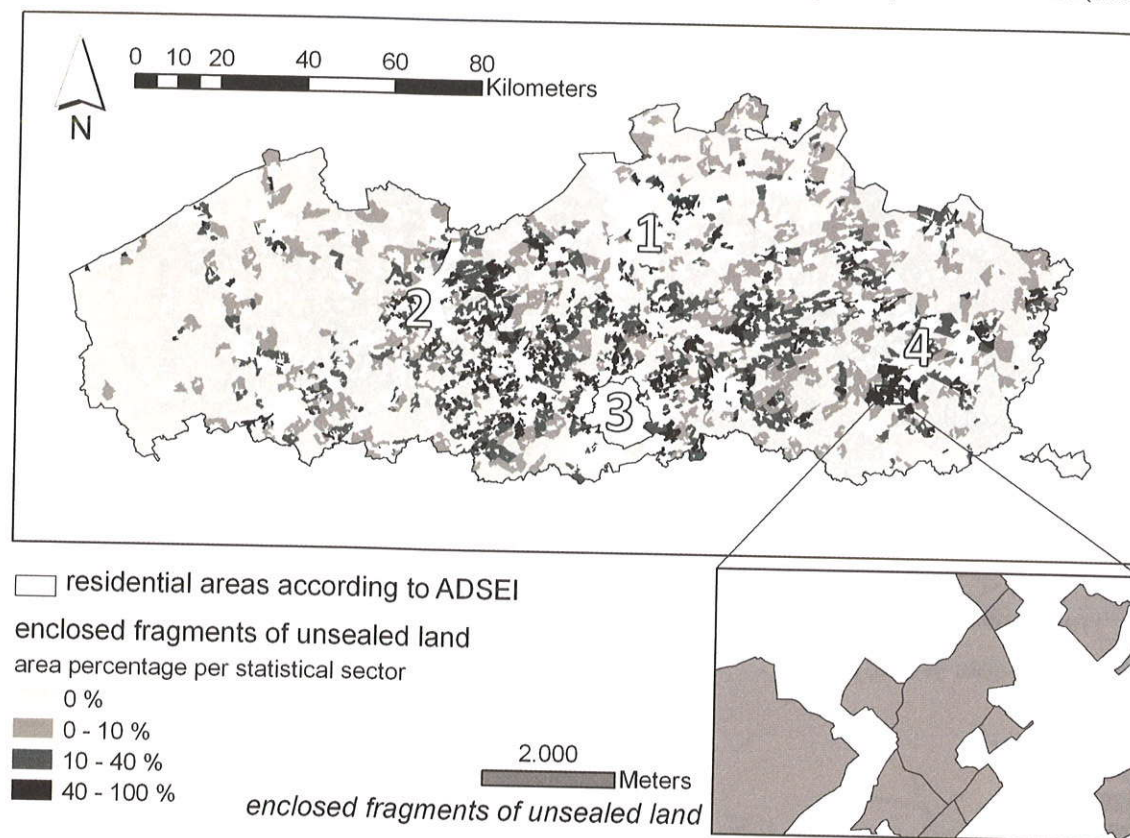
from the more central part, as areas where the open space fragments are (in some degree) still visually present for the inhabitants or visitors.

Density of open space fragments

Figure 4.11 shows a map with the area percentages of open space fragments, per statistical sector. These open space fragments are mainly located in the central part of Flanders, between the cities of Antwerp (1), Ghent (2)

and Brussels (3). An eastern extension is visible, stretching toward Hasselt-Genk (4), but is not that present anymore in the province of Limburg. This differs from what can be seen in Figure 4.9. A western extension is totally lacking, despite a very prominent western extension of the ribbon densities. This means that ribbon development does not necessarily result in the complete closure of space fragments.

Figure 4.11 Area percentage of enclosed open space fragments, per statistical sector (2005).



The relation between building patterns and gardens

Although the described methods were initially developed for analyzing building patterns in Flemish rural and semi-urban areas, they can be useful for the study of gardens too because of the strong relationship between houses and gardens. These methods give information on the location of gardens and their spatial organization. They make it possible to examine the relationship between different building patterns

and the respective garden area. Moreover the results give insight into other 'garden-related' private phenomena in Flemish rural areas, like recreational pastures.

Garden connectivity

Ribbon and dot patterns have different consequences for the connectivity of individual gardens. The research of Dewaelheyns et al. (2009) confirms this proposition. Based on a proximity analysis in the municipality of

Figure 4.12 Ribbon pattern and well connected gardens.

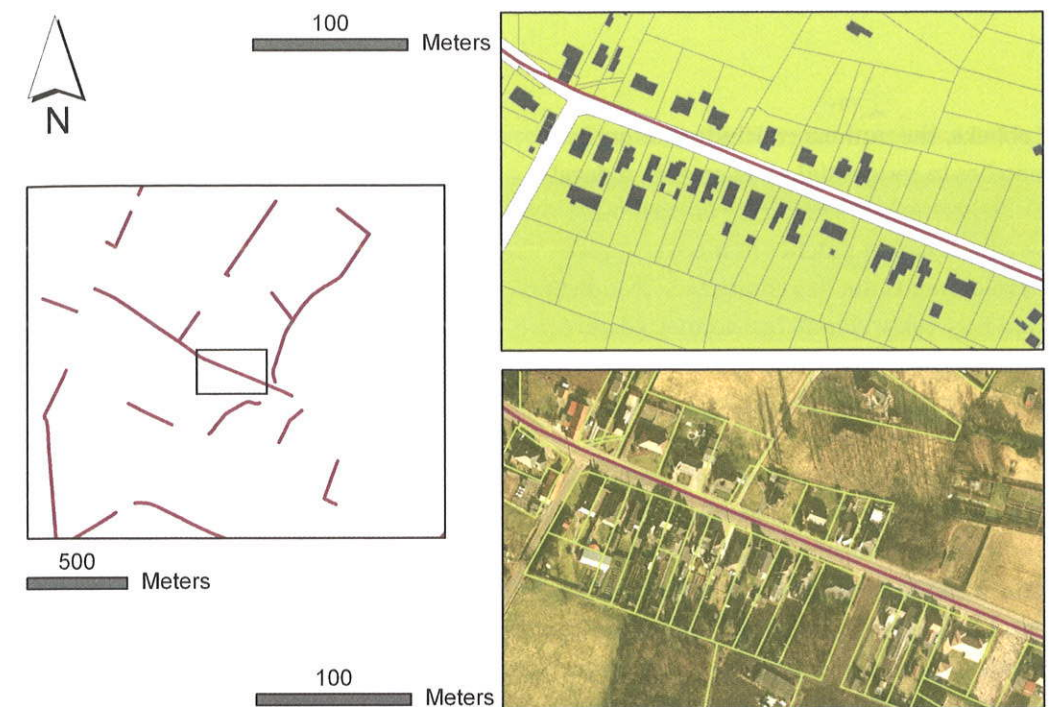
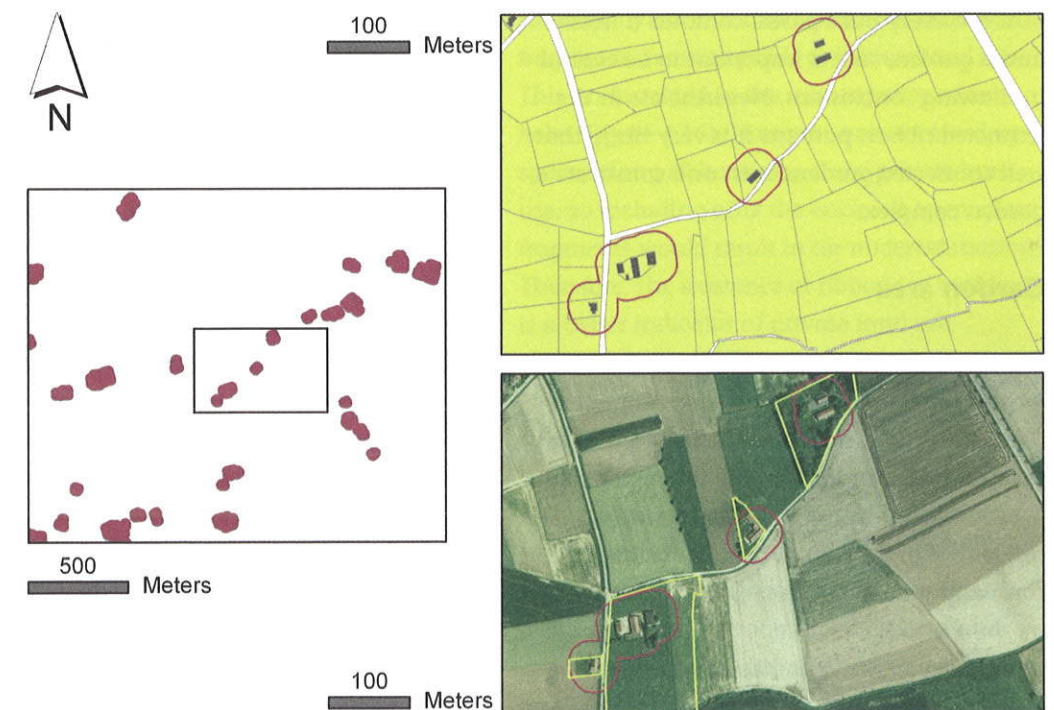


Figure 4.13 Dot pattern and less connected gardens.



Lebbeke, the authors conclude that garden patches in residential cores or ribbon developments are well connected to each other whereas garden patches in more scattered developments are less connected. This distinction between well and less connected garden patches is scale-dependent. Within residential areas, small gardens form well connected complexes of gardens, while more rural gardens are larger but less connected to each other.

The techniques described in this chapter surely can contribute to the analysis of garden connectivity. It can be assumed that the extracted ribbon and dot patterns have a strong relation with respectively well and less connected gardens, as can be seen in Figure 4.12 and Figure 4.13. Of course it must be realized that not every built parcel contains a house and a garden, so it is important to be careful in drawing conclusions. Nevertheless in the extracted ribbon patterns it is very likely that well connected gardens exist and constitute a garden complex.

Garden area

Because a detailed and accurate map with the location and area of gardens does not exist (Dewaelheyns et al., 2009), an approximate method was used to examine the relationship between the morphological configuration of residential buildings (ribbon, dot or residential core) and the area of the respective gardens.

In order to obtain a dataset containing only residential buildings, agricultural

and non-residential buildings and their cadastral parcels are excluded from the data set. To calculate the garden area, the area of the buildings was subtracted from the total parcel area. These parcels do not only contain gardens, however; other land uses (woods, terraces, premises, pastures, wasteland...) are also included. To exclude these other land use classes, a topographical land use map containing the land use class 'garden' is used. Dewaelheyns et al. (2009) already concluded that this map gives an overestimation of the total garden area. For example green industrial grounds, woodlands and wastelands may be incorrectly categorized as 'garden'. By intersecting the land use class 'garden' with the selected parcels, part of the divergence will be eliminated. For each of the three morphological configurations, the total area of buildings, parcels (minus buildings) and garden area falling in these parcels was calculated for Flanders. The results can be found in Table 4.1. The ratio of garden area over built area is quite comparable in residential cores and scattered developments. In ribbon developments the ratio of garden area over built area is significantly higher. These results are confirmed by the map of Bomans et al. in Chapter 3 that shows the adjusted area percentage of gardens per statistical sector (Figure 3.5). Among all the density maps, the map with ribbon densities corresponds best with this map. This interesting conclusion, a relatively higher garden area in ribbon developments, stresses the relevance of the developed methods for the research on gardens.

Table 4.1 Area of buildings, parcels and gardens in the different morphological settings.

	ADSEI residential cores		ribbons of buildings		dots of buildings	
	area (m ²)	relative	area (m ²)	relative	area (m ²)	relative
area of buildings	297,257,589	(1)	71,608,990	(1)	38,996,425	(1)
area of parcels minus buildings	1,730,701,320	5.82	637,644,378	8.90	672,715,854	17.25
area of gardens on parcels	994,663,797	3.35	296,026,342	4.13	118,153,388	3.03

Other 'garden related' phenomena in Flemish rural and semi-urban areas

As already mentioned in the beginning of this chapter, the phenomena of privatized rural land use seem to occur mainly in the vicinity of residential development. So recreational pastures or vegetable gardens, adjacent or separate from the home parcel can be seen either as physical extensions of existing gardens or can be interpreted as the broadening of the garden concept itself. The assessment of the building patterns can contribute to insights into the patterns of private land use in rural and semi-urban areas.

To examine the relations between building patterns and private land use, the results of previous terrain studies across Flanders were used (Verbeek et al., 2010b). On the one hand, dot patterns seem to be correlated with vast open space areas and a low degree of private land use. An example in the municipality of Brakel shows a building pattern consisting mainly of scattered development (Figure 4.14). Parcels with a private land use are typically found around these building dots. On the other hand, ribbon patterns seem to be correlated with enclosed open space fragments and

a high degree of private land use. An example in the municipality of Keerbergen shows this relation (Figure 4.15): an enclosed open space zone surrounded by stretches of ribbons. Field study results show that many of the parcels in this enclosed zone are used for private purposes instead of productive agriculture.

The defined enclosed open space fragments are also related to private land use. Being surrounded by ribbons and residential areas, these fragments are susceptible to private land use. This is illustrated in the municipality of Lebbeke (Figure 4.16). However, non-enclosed open spaces along ribbons also show private land use, so including only the enclosed open space fragments would result in an underestimation. Therefore, the existence of ribbons of buildings is a better indicator of private land use.

Discussion

A new approach to the study of the morphological pattern of Flanders was developed, but it has some drawbacks. First, it relies on the arbitrary definition of buffer distances and ratio limits to select linear and scattered patterns. Together with the quality of the datasets

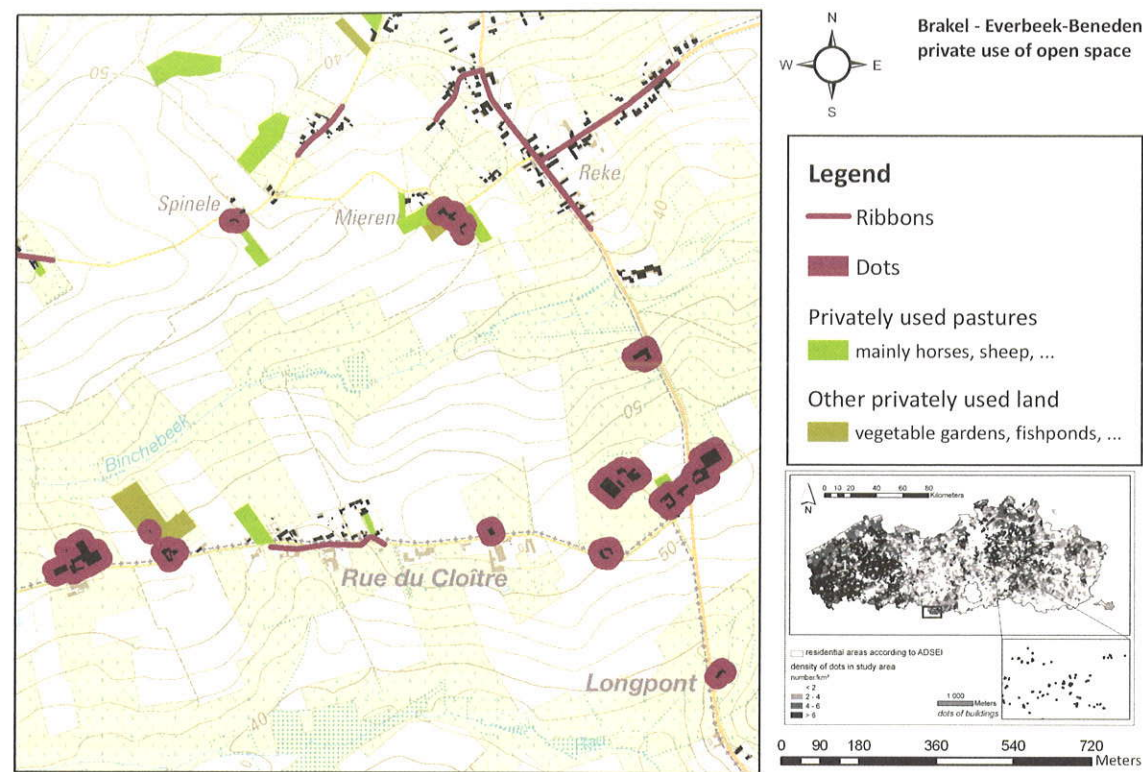


Figure 4.14 Dot patterns and private use of rural land in Brakel.

Figure 4.15 Ribbon patterns and private use of rural land in Keerbergen.

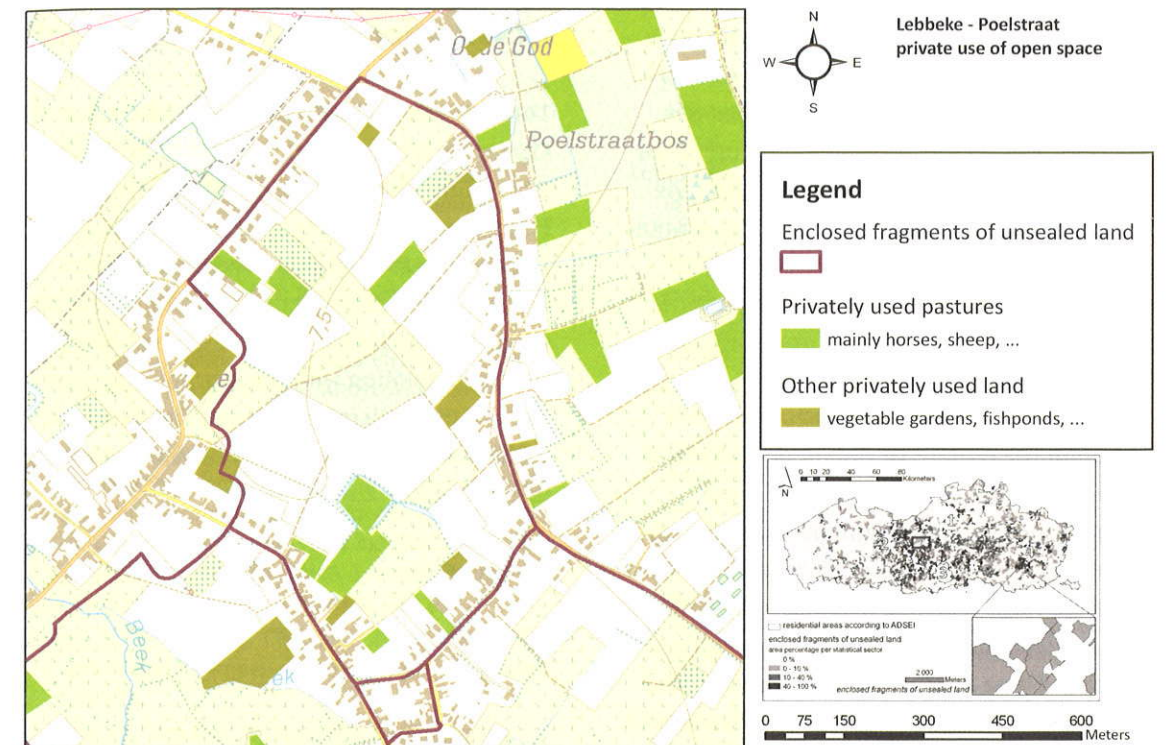
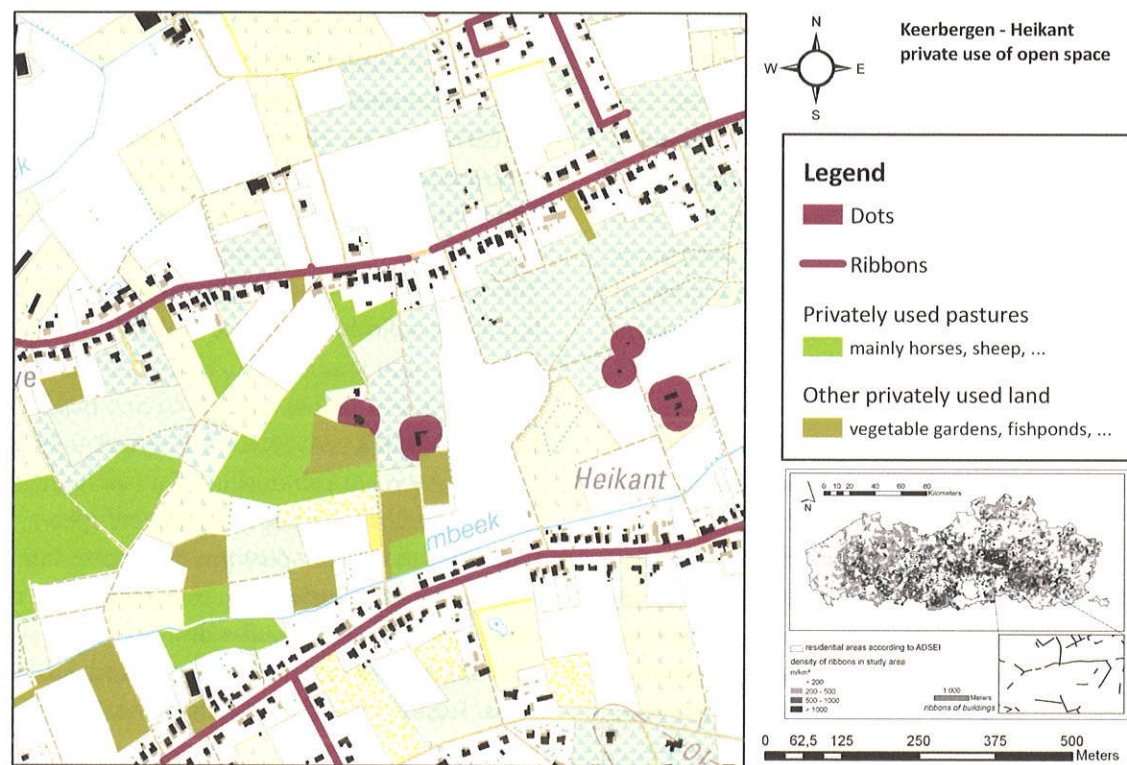


Figure 4.16 Enclosed open space fragments and private use of rural land in Lebbeke.

used, these arbitrary thresholds strongly determine the outcome of the computations. More research is needed to define the best option for the limiting distances and ratios. Secondly, the main problem with datasets containing built elements is the time aspect. Built elements change rapidly and up-to-date datasets are difficult to obtain. However, this limitation does not put a burden on the current research, since the ambition is to analyze the general settlement pattern.

Despite these shortcomings, the methods described succeeded in analyzing building

patterns in the Flemish rural and semi-urban areas in a totally new way. Notwithstanding the fact that these techniques were developed to gain new insights into the building structure, they can be useful for the research on garden patterns as well. First, these techniques can give an indication as to the connectivity of individual gardens, a spatial qualification that is relevant for planning, environmental management, ecology and social cohesion. Secondly, it was interesting to compare the built-up area of the different building patterns with the respective area of garden land use. The buildings in the ribbon development

correspond with larger areas of garden, while buildings lying in residential cores or dots of buildings have relatively less associated garden area. Finally, the techniques are useful for research on private 'garden related' land use in Flemish rural and semi-urban areas. Ribbon patterns are often related to phenomena of higher private land use whereas dot patterns are related to vast open space areas still used for productive agriculture.

Although the pattern of ribbon development proved to be the best indicator to locate private land use, the technique of selecting enclosed fragments is also relevant since these areas are most sensitive to transformations from professional agriculture to recreational farming. These conclusions are based on the results in a few case areas. More research is needed to reach more thorough conclusions.

Whether the private use of rural land is problematic or not, is context-dependent. Society has to wonder whether it is desirable that people occupy parts of the rural areas and fence them off to create their own private 'living space'. Recreational pastures continue to increase in number, but this evolution can possibly contribute to an attractive countryside if the pastures are well placed in their spatial context. In many fragmented regions, recreational farming is more likely to survive than productive agriculture. On the contrary, rising land prices can make it difficult for small farming companies to continue. Further research is necessary and developing a sustainable spatial policy for our threatened rural areas is a major challenge.

Acknowledgement

The research method was developed by the Center for Mobility and Spatial Planning at Ghent University, within the framework of the Policy Research Center on Space and Housing, financed by the Flemish Government. This Flemish research project aims to respond to the need for more specialized and context-specific metrics in dealing with the morphological aspects of the settlement pattern. The described method was carried out in a GIS environment, using ArcGIS 9.2 software.

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The **Powerful** Garden

Although domestic gardens cover a significant area, they are one of the least known land use categories. Hidden behind the façade of urban and residential development, they are currently a footnote in housing policy and not explicit included in spatial planning, socio-economic and environmental policies. Households consider domestic gardens mainly as little paradises, safe family havens and places of direct contact with nature. However, hundreds of thousands of gardens make a big thing. The collectivity of domestic gardens – the ‘garden complex’ – can play a strategic role in various challenges of our society like public health, environment, biodiversity, food security and climate change. This book presents a collection of emerging views on the garden complex in order to put the garden on the different agendas of research and policy. It collects the current state of knowledge on gardens from different experts in various disciplines, mainly in a Flemish context. The authors write about the background of the present-day Flemish garden, their spatial distribution and connection, the impact of gardens on the environment, biodiversity in gardens, and the role of gardens in the livability of neighborhoods. Together with other green themes like greenways, community gardens and urban agriculture, domestic gardens are part of an important rural-urban interface. It is time for more systematic research on gardens, and planners and managers should give more attention to the green faces of development in their strategies towards enhanced sustainability.

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ISBN 978-90-441-2733-1



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